

nate our radical ignorance of the future. It may, however, increase the general confidence that what is true and workable today will persist into tomorrow (18).

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Evaluation of Trucking Entry Control: The Exempt Backhaul Case

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This paper traces the potential effects of limiting trucking regulation by permitting independent operators to carry nonexempt general commodities on backhauls following the transportation of exempt agricultural products. These effects are determined by vehicle flows that establish the physical opportunity for traffic switches among regulated carriers and independent operators promoting efficiency, economically feasible modifications in traffic patterns, and the behavioral patterns of the regulated carriers, independent operators, and shippers. The logistical data are drawn from an Interstate Commerce Commission survey of more than 13 000 truck trips in 1975 that defines the competitive relations among the industry segments. These data indicate little prospect for productivity improvements due to saving empty trips; however, cost savings by independent operators are possible. They would gain in lease-bargaining strength, but orderly price competition between them and the regulated carriers would be quite limited except for Florida where it might be ex-

treme. Service improvements are not indicated, but some deterioration may be hypothesized for Florida's outbound general commodities. The proposed regulatory change offers disadvantages with minimal gains. Adverse effects arise from the continuing regulation of outbound general commodities that can destabilize the Florida trucking market; the eligibility rule for inbound general commodities, which both limits competition and prevents intermarket capacity mobility; and the danger of disorderly market behavior. Even though regulation may be wasteful according to the dictates of the competitive model, partial deregulation may be counterproductive unless it is carefully designed so that the residual element of freedom and control mesh and do not clash as in this case.

Much of the economic support for partial or complete decontrol of the trucking industry is based on the classic competitive model. Manifesting the model's stipulated economic attributes, trucking should produce more efficient pricing and output results with less or no regulation. This model was designed, however, for commodity production in a "state of nature" and not for transport service production by an industry that has been strictly regulated for more than 40 years. The model's ability to predict the benign consequence of withdrawing that complete control from this complex and fragmented industry, with its institutional encrustation and behavioral idiosyncracies, warrants examination (1).

The analytical starting point is present conditions and not a competitive norm. Empirical analysis, largely lacking to date, is required to grasp the institutional and behavioral realities that will shape the market dynamics and associated results of a regulatory change (2). Accordingly, this paper assesses the potential market results and associated impacts on affected interests of a specific step in trucking deregulation. It is designed both to explore key elements of the evaluation process as it is applied to an incremental change in regulation and to develop insights and conclusions about its effects.

The paper focuses on issues raised by the role of an industry segment composed of independent truckers categorized as owner-operators. More specifically, it deals with a subgroup specializing in hauling exempt agricultural products but that is excluded from carrying other (general) commodities except as lessors for the regulated carriers.

The restrictions on the market participation of these operators are said to hamper trucking productivity, impair trucking services to agricultural product shippers, and constrict artificially the economic viability of an important segment of the transport system and a socially significant set of small businesses. Entering the general commodity transport markets only as agents of the carriers (through vehicle and driver leases), they are without real bargaining power under prevailing oligopsony and, accordingly, are inadequately compensated.

The postulated change would permit these owner-operators to carry nonexempt general commodities on backhauls following the transportation of exempt agricultural products. The permitted backhaul movement must return to or near the front-haul origin or to intermediate points on reasonably direct routes. For the most interesting case, competitive pricing freedom is also stipulated for the eligible hauls and no restrictions are placed on the amount of capacity the independent operators are allowed to introduce into these markets. A more restrictive but less interesting case would require observance of published tariff rates and impose a "grandfather" requirement.

It is argued that this proposal would introduce a new competitive element into general commodity trucking with favorable implications for productivity. Efficiency gains would result from the elimination of duplicated vehicle travel, from squeezing down high markup rates, and from the dynamic pressure of competition itself. Desirable income distribution effects would also be realized from traffic attraction to the independent operators and from their strengthened position in lease negotiations, along with shipper-carrier redistributions from rate reductions.

Translating changed regulation into market effects involves a long and complex process; predicting the results of a regulatory proposal entails an equally intricate analysis. The broad leap from a posited change in regulation to its indicated impacts on affected interests requires numerous analytical steps to match the induced market dynamics. The empirical results of a regulatory

change are sensitive to subtle market relationships; by the same token, the analytical results are sensitive to the associated measurements.

This paper concentrates on three sets of key relationships that significantly affect the potential results of implementing the postulated regulatory change:

1. Traffic and vehicle flows determine the physical opportunity for efficiency-promoting traffic switches between the common carrier and independent operator segments.
2. Intersegment competitive relations regarding vehicle-kilometer costs and reverse-direction revenues determine whether the options available to both segments are economically feasible for achieving modifications in operating and traffic patterns that promote efficiency.
3. The decision criteria and behavioral patterns of the regulated carrier and independent operator participants and of the shippers determine the extent to which managerial implementation of the efficiency potential will be pursued. These responses are conditioned by economic criteria, institutional constraints, and behavioral (subjective) propensities. The realized responses will be transmitted to the markets through output and price effects involving intersegment and intermarket resource shifts in both primary (invaded) and secondary markets, depending on demand and supply elasticities.

LOGISTICAL PROFILE

The dynamics that would be triggered by the proposed regulatory policy change, and hence its ultimate impact, depend initially and primarily on the logistics profile. This profile delineates the flows of commodities and vehicles associated with transportation service to the relevant markets and thus establishes the physical base for potential market dynamics.

The relevant industry segments embrace the regulated carriers and independent operators. The former class basically covers irregular-route common carriers certified by the Interstate Commerce Commission (ICC) and authorized to carry general commodities between the agricultural production origins and their markets. The commodity categories are agricultural products exempt from regulation and general commodities requiring ICC authorization for their transportation. The primary hauls involve the transportation of exempt commodities from the important agricultural produce areas to major consuming areas in the Northeast and of general commodities into the agricultural regions. Relevant movements are those for which the two industry segments are acceptable substitutes, as determined primarily by vehicle compatibility, regulatory restrictions, and timing.

A primary logistical consideration is the directional balances of the loaded vehicle movements. In general terms, the hauls of interest involve a preponderant flow of manufactured commodities from the Northeast and a much smaller reverse movement. Agricultural commodities move in large volumes into the Northeast. The vehicle flows thus entail a larger capacity requirement from the Northeast than in the return direction for the regulated carriers. The main haul of the exempt operators is accordingly in the opposite direction into the Northeast. The indicated balances are mitigated, however, by the hauls of general commodities from the Northeast by the independent operators through leases to the regulated carriers and of exempt products by the regulated carriers.

The lack of empirical data has seriously hampered research in truck transportation markets. Although the problem persists, some significant progress is being

made. The logistics data for this paper were drawn from the tapes of the ICC survey reported in *Empty/Loaded Truck Miles on Interstate Highways During 1976* (3). This survey covered more than 13 000 vehicle trips in that year, providing details of vehicle type, carrier category, origin and destination, commodity carried, and whether the vehicle was under lease. The data extracted cover loaded and empty vehicle trips in vans (including refrigerated vans) by owner operators and irregular-route common carriers between specified agricultural production areas and the Northeast. The producing regions are Florida, Texas, and the West (California, Arizona, and Washington). Loads are segregated between exempt agricultural products and general commodities.

These logistical data establish the physical feasibility of effecting efficiency-producing changes in vehicle use. Further, they define and measure the competitive relationships between the industry segments that could result from the regulatory proposal. Favorable efficiency effects can stem from two bases. The logistical pattern may feature reverse-direction empty backhauls that could be eliminated by the proposed institutional change; this action would make the independent operators an acceptable substitute for the regulated carriers. The new arrangement may also permit the use of a more efficient substitute.

Observations about the comparative efficiency of the two industry segments are discussed next when addressing the economic feasibility of market developments from the regulatory proposal. But assumptions or hypotheses about comparative economic advantage are required to warrant the first step of determining physical feasibility. If the economic conditions underlying substitution are lacking, the physical arrangement of vehicle flows is of little consequence and significant intersegment competition is unlikely. This discussion thus postulates an economic basis for the independent operators to compete effectively for the traffic of the regulated carriers as a result of the regulatory proposal. The alternative assumption is sterile because it implies that the independent operators are powerless to respond to the physical opportunities that may be available in the face of the regulatory change.

Although some attributes of the vehicle flows are rather general, the most interesting aspect is strong regional differentiation. The diversities involve such variables as proportions of exempt traffic, traffic balance ratios for commodity categories and industry segments, vehicle employment, and vehicle leasing. The variations consistently combine to produce highly differentiated logistical patterns for the several regions that strongly condition the potential response to the regulatory change.

One critical regional difference is in traffic balances. The predominant West displays the most unbalanced traffic flows for each commodity category but a fortuitous combination that produces a highly balanced composite pattern. The associated industry segment imbalances are significantly in opposite directions but are relatively modest. This feature permits only minor productivity gains from the elimination of redundant vehicle kilometers. Traffic flows are characterized by a very high degree of regulated carrier participation in exempt product hauls.

Texas, the least important quantitatively, is characterized by a critical reversal. Unlike the West, where the predominant flows are inbound for the regulated carriers and outbound for the independent operators, inbound traffic is heavier for both groups in Texas. This anomaly arises because of the relatively small share of exempt products in the traffic mix. The independent op-

erators are thus used relatively more for hauling outbound general commodities under lease and accordingly assume the haul pattern of the regulated carriers. This pattern offers no opportunity to reduce redundant vehicle kilometers.

In contrast to the West, Florida is characterized by an unusually high proportion of regulated commodities in its outbound mix, partly reflecting frozen foods shipments. As a result, the regulated carriers demonstrate a very close traffic balance and an orderly in-and-out flow of vehicles. The independent operators provide a sharp contrast, experiencing by far the most unbalanced traffic of any category with poor inbound vehicle utilization. As in Texas, the prospects are dim for improved vehicle utilization. The logistics do permit, however, a straight substitution of independent operator vehicles for those of regulated carriers for inbound general commodity loads.

Another significant attribute of the logistical pattern is the sharp regional difference in the critical determinants of potential competition. The following table summarizes some key relationships for the three regions (the first line indicates the relative weights of the separate markets; the other lines relate the indicated variables to the inbound general commodity loads in index form for comparative purposes):

Load Category	West	Florida	Texas
Weight (inbound general commodity loads) (1)	0.58	0.25	0.17
Inbound general commodity loads (2)	100	100	100
Independent operator eligible loads (3)	67	78	31
Reserved loads, regulated carriers (4) (2 minus 3)	33	22	69
Vehicle supply, regulated carriers (5)	35	49	47
Vehicle supply, independent carriers (6)	68	109	62
Guaranteed loads, regulated carriers (7) (smaller of 4 or 5)	33	22	47
Price competition loads (8) (5 minus 4)	2	27	0
Direct carriage option loads (9) (3 minus 8)	65	51	31
Ratio, available vehicles to eligible loads (10)	1.2	1.7	1.1

The general commodity loads for which the independent operators are eligible are determined under the regulatory proposal by the number of outbound loads of exempt agricultural products they carry, with the balance "reserved" for the regulated carriers. The Texas ratios are the most favorable for the regulated carriers, and the Florida ratios are the least favorable. The ratio of available carrier-owned vehicles is low in the West; independent-operator vehicles are relatively numerous in Florida. The number of loads guaranteed for the regulated carriers (the reserved loads covered by owned vehicles) is relatively low in Texas and high in the West. A significant indicator of market penetration is the direct-carriage-option-lease category, which denotes the number of loads that the independent operators are eligible to carry directly without competition from available carrier vehicles. This option is relatively low for Texas but high for the West because of the low ratio of carrier-owned vehicles. Another important indicator is the direct price competition between the regulated carrier and the independent operator segments; this denotes a confrontation between eligible independent operator vehicles and carrier vehicles that exceed the number of reserved loads. Florida is highest in this respect and Texas is lowest. The final vehicle ratio is

a more inclusive indicator of competitiveness, introducing the ineligible independent operator vehicles. They can participate through straight leasing without the direct-carriage option, correspondingly can reduce the availability of that leasing option to eligible carriers, and can force the equivalent number of operators into price competition if they are to participate in the traffic. Florida is by far the highest for this significant indicator, with nearly two vehicles available for every load for which the independent operators are eligible; this indicates severe competition in contrast to Texas and the West. If this competition is sufficiently severe to jeopardize inbound regulated-carrier capacity, outbound general commodity service is thereby threatened.

The competitive patterns revealed in the vehicle logistics and thus the possible effects of the regulatory proposal are quite different for the several regions. In summary, the West offers little possibility of price competition but a great opportunity for the independent operators to engage in direct solicitation as an alternative to leasing. The Florida case also provides substantial opportunity for direct solicitation as a negotiating base for leasing, but in addition features a high degree of potential price competition both between the regulated and independent segments and among the independents. The Texas pattern emphasizes the status quo because the independent operators are ineligible to carry directly a sizable share of the trips, which precludes price competition and limits their bargaining power in leasing.

Although these logistical arrangements independently do not determine the competitive impacts that might be expected from relaxing regulation of independent operator backhauls, they set the stage and define limits. They are critical for determining the options available to the industry segments under changed regulatory rules.

COMPARATIVE ECONOMIC ADVANTAGE

The vehicle trips depicted represent a case of joint supply with multiple products resulting from provision of bi-directional transportation capacity. The round trip is the unit of output and cost because it is impossible to meaningfully segregate directionally the joint vehicle operating costs. Of course, they may be supplemented by the special costs peculiarly associated with the actual movement of traffic (beyond the provision of capacity) in each direction. These special costs would include extra fuel, loading and unloading, use-related depreciation or repair, billing, and solicitation. Although the round-trip sequence is not strictly realized in all cases because of some overlapping regional flows and triangular trips, that pattern is generally characteristic.

Cost is a patently significant element in determining the comparative economic advantage of the two industry segments, including those for providing round trips between the Northeast and the agricultural areas and those incurred specially from hauling loads in each direction. The other significant element in this joint product case is the comparative revenues received from the outbound general commodities and exempt agricultural products. Thus, the amount each industry segment must get for hauls from the Northeast to participate in the market depends both on their round trip and special costs and on their opposite direction revenues.

Costs

The relationship between the generalized costs of the regulated carriers and independent operators has not been established definitively. The uncertainty of this

relationship is reflected in the ICC's long and largely unsuccessful struggle to deal with it in industry rate cases where leased transportation is significantly involved. Despite the problems, recent research appears to be fruitful and indicates a slight cost advantage for exempt owner-operators over irregular route common carriers employing company drivers and operating similar equipment (4). This cost advantage (approximately 5 percent) is not overwhelming but would permit a meaningful degree of competition.

Of potentially greater significance than the vehicle operating costs, however, are those for the marketing and other ancillary services rendered by the carriers for themselves and their lessors and by brokers for the exempt operators. The commission charged by the brokers is around 8-10 percent of the trip revenues; carriers typically keep 25 percent (5). Direct comparison is difficult because the services performed are not identical. The hypothesis that the carrier commission contain a rental for the use of a relatively scarce operating certificate is not verified by any significant correlation between the extent of vehicle leasing and favorable operating ratios. One attempt at unraveling these comparative costs suggests an advantage for the brokers (6).

More significant than present arrangements, however, are the cost and effectiveness of the market mechanism that might emerge with the competitive freedom involved in the regulatory proposal. An integrated marketing system may be contemplated that capitalizes on available information technology to provide more cost-effective services than are feasible for individual carriers under the present system. These speculations, combined with the vehicle operating cost indications, make it reasonable to posit some cost advantage for the independent operators.

Revenues

The revenue side of the comparative economics coin is even more speculative. The regulated general commodity rates are not uniform by commodities and the exempt agricultural product rates are subject to sharp seasonal swings. Furthermore, neither set of rates is immutable. An expansion of the role of brokers in organizing exempt truck transportation could firm up the agricultural commodity rates. By the same token, if demand elasticity permits, any competitive assault on the general commodity rates from the Northeast might warrant an authorized increase in the reverse-direction rates.

Some insights are available, however. The significant participation of the regulated carriers in exempt hauling, particularly from the West, warrants the hypothesis that the earnings from the exempt and general commodity traffic categories would balance out over the year of seasonal swings in the agricultural produce rates. This hypothesis is supported by limited inquiry in the industry. It is at least doubtful that any one-way revenue considerations would overbalance the cost advantage posited for the independent operators.

Available empirical evidence appears to support hypotheses pointing to a modest competitive advantage for the independent operators. Such an advantage is far from overwhelming in general and would be most uneven in its application, depending on specific commodities carried by particular regulated carriers and by individual operating efficiency. The advantage appears to be great enough, however, to permit an entry by the independent operators into the general commodity markets and to suggest that the regulatory proposal would

not be trivial because of a lack of economic opportunity for these operators.

DECISION PATHS

Decision options responsive to the logistical and economic feasibility of competitive interaction are distinguished by reference to four traffic categories characterizing the inbound general commodity movements that represent the field for the potential new competition:

1. The guaranteed loads for the common carriers are both reserved by limited independent operator competitive eligibility and covered by owned vehicles.
2. Direct-carriage-option-lease loads are open to the independent operators by virtue of their eligibility for hauling general commodities but are not confronted by regulated carrier vehicle capacity able to compete for the traffic.
3. Straight-lease loads are the reserved loads neither covered by owned vehicles nor subject to the direct-carriage-leasing option because of limited independent operator eligibility.
4. Price competition loads fall within the limits of independent operator eligibility but are confronted with competition from regulated-carrier vehicles in excess of the number required for reserved loads.

These categories represent only proportions of the inbound general commodity loads because the traffic is not earmarked. The options are exercised and the decisions made by individual carriers and operators and not by composite industry segments. Orderly markets require employment of the independent operator vehicles; this action is consistent with the overall regional allocations. Independent operators can cover the entire market, but the regulated carriers are limited by their operating authority. If, for example, independents should offer shippers reduced rates in direct solicitation when favorable leasing arrangements are available, owned vehicles prohibited from turning to other commodities or hauls are displaced. The indicated result of this excessive price competition is capacity disruption and service deterioration. Orderly market results may be elusive where alternative business arrangements are required and only some of the capacity is freely allocated among submarkets.

Despite the complications, these categories establish the types of decisions and the options open to members of the two industry segments. The guaranteed and straight-lease loads create no additional options and require no new choices by either type. The direct-carriage-option-lease loads give the independent operators the choice of leasing or carrying the traffic on their own account; the carriers' choice is to meet the lease conditions or relinquish the traffic. The price-competition loads give both parties little choice in the usual sense of whether to institute active competition with a price reduction to increase market share. Rather, in the "one-on-one" relationship that would prevail in these markets, independent operators in specific situations must quote less than the initial price in order to attract the business requiring a regulated carrier response. There is a link between the direct-carriage and price-competition loads arising from the determination of the traffic to be accorded each type of treatment. The carriers can open with lease concessions in one category in an effort to protect it or another from price competition. Similarly, the independent operators can choose where they will direct their competitive attention.

The decision path will embrace both outright compe-

tion from some independent operator vehicles and the threat of such competition from others, with concomitant effects on lease terms and on the negotiating position of the trucking parties. Some independent operators stand to gain either by entering direct carriage or from more favorable leases. On the other hand, those under lease may lose out to other independents in the new competition. Competition among the independent operators could drive rates down to a level yielding less revenue than that provided by the leases.

Leasing

In one independent operator choice, leasing proceeds must be compared to the profit potential from direct carriage. For the carriers, the minimum acceptable share of revenues is established by their costs of providing marketing and ancillary services. For the independent operators, the maximum allowance is set by the cost of obtaining these services elsewhere, ostensibly from brokers. Preliminary measurements are established by the 25 percent share usually retained by the carriers and the 8-10 percent commission paid the exempt brokers as adjusted for service differences.

The objective, however, is not the percentage of revenue but the actual dollar yield, requiring further consideration of the respective base revenues. The 25 percent retained by the carriers applies to the trip yield derived from current rates. The 10 percent commission taken by the brokers, on the other hand, may apply to rates forced down by price competition. To illustrate, with rates of \$1.00 and \$0.80, the 25 percent would give the independent operator a net of \$0.75 compared to \$0.72 that results from a more favorable share of the lower rate. The anticipated yield from direct market participation is clearly an imponderable where price competition is involved, particularly when compounded by the joint cost influence.

The independent operators would probably favor leasing even where direct carriage is an option because rate concessions would probably be required. The regulated carriers would also lose from price competition and would accept it only as the last resort. Having no alternative in the short run, leasing carriers (lessees) have every incentive to maintain this relationship on the most profitable basis possible. Those with both owned and leased capacity, the most common configuration, would presumably make leasing adjustments to forestall price competition.

Price Competition

In assessing potential market reactions to the proposed regulatory change, a fundamental question is the extent of the price cuts that might be expected under competition. In the absence of regulatory or other institutional restraint, the competitive solution is dictated by the joint product-joint cost character of these markets. The cuts would depend on the relative elasticities of demand in the primary market and in the reverse direction. In purely competitive terms, equilibrium would be reached when the prices on general commodities moving from the Northeast provided the required marginal capacity with revenue sufficient to cover fully round-trip and special directional costs. However, competitive reductions would be restrained by leasing, with the available lease revenues setting the lower rate limits. Because the independent operators would have no incentive to press rates below this level, this limit also hinges on the real gap between the commissions of the carriers and the brokers.

Shipper Decisions

Given the required logistical and economic relationships, shippers are the ultimate arbiters of the primary market effects of the regulatory proposal. Their attitudes and decisions will significantly determine the results of carrier-operator choices between leasing and direct carriage and, where it arises, the outcome of price competition. The critical question is the acceptability of independent owner-operators as direct substitutes for the regulated carriers for transporting nonexempt general commodities.

Shippers may be hesitant to deal directly with independent operators because of feelings of abstract loyalty to common carriers and because of concerns for service and financial responsibility. On the positive side, there is evidence that the performance of independent operators may be superior to that of hired drivers (7). Such attributes should carry over to direct carriage to confirm that their solicitations would not be rejected by shippers on grounds of inferior or undependable service.

In addition to these inferences, manifestations of shipper behavior are instructive. Using agricultural cooperative vehicles on backhauls provides some direct evidence. Recent ICC hearings involving this traffic elicited testimony from important shippers, such as General Mills, Eli Lilly, and PPG Industries, of the attractiveness of the service and the rates offered by operators bypassing the organized common carrier segment (8).

Although the shipping community's probable general acceptance of independent operators as direct carriers is indicated, an effective market mechanism would be required as a substitute for the functions performed by the regulated carriers under the lease arrangements. In addition to brokerage and related activities, some assumption of responsibility for service and financial reliability would probably be required.

Indicated Results

The leasing preference indicates a decision option hierarchy for both the independent operators and the regulated carriers. The independent operators, under the impetus of the regulatory proposal, are the active force in accommodation and the regulated carriers are the responders. Self-interest criteria indicate that independent operators with the direct-carriage option will want to match up with a regulated carrier that requires a lessee. This may be done as well under direct carriage only if rate reductions are not required to obtain the haul. Direct price-competition confrontations with regulated carriers would be reserved for the minimum number of loads requiring it in terms of regional logistics. Carriers, on the other hand, would in the abstract prefer straight leasing with ineligible independent operators or carriage in owned vehicles free of price competition, depending on vehicle ownership posture. Leasing adjustments under the pressure of the direct-carriage option and price competition are the regulated carriers' last resorts.

The regional (macro) markets have a place for each of these categories. Slotting the independent operator capacity is confounded, however, by the absence of earmarked traffic and atomized and relatively uninformed decision making. This potential market imperfection suggests and reinforces the need for the advanced mechanism previously indicated.

Perfect slotting would not be achieved in any case. In practice, the independent operators would distribute their capacity among the carrier-defined submarkets according to economic opportunity reflecting both traffic

availability in geographical terms and profit potential, engaging in price competition or filling a vehicle void as circumstances dictate. But the essential interchangeability of the independent operators in combination with their dominant market weight should dictate an outcome in which the marginal rewards of price competition and leasing are fairly equalized.

This hypothesis is strengthened by the common denominator variable that measures the limits of both competitive price cuts and the lease-bargaining advantage from the direct-carriage alternative. The critical variable of cost and service is associated with the commissions of the brokers and lessee carriers that determine the cost advantage that the broker-independent operator combination would have in price competition. The result of the regulatory change thus depends even more on the market mechanism that would be created to serve the direct-carriage option of the independent operators and its efficiency in performing the required services.

MARKET RESULTS

Having traced through the aspects of the evaluation process dealing with the logistical attributes, economic capabilities, and behavioral patterns, the interesting question centers on the ultimate implications of the associated factors that have been established, hypothesized, or postulated. The results are not only cloudy but highly sensitive to relatively few key variables. These include the directional balances of the two traffic categories and industry segments, economic capabilities as measured in cost and revenue relationships, vehicle ownership patterns of the carriers, and the market mechanism that emerges. Alternative readings of or experiences with these variables can produce analytical or real market results that range from trivial to fundamental.

Despite this sensitivity, the observations and plausible hypotheses advanced thus far warrant further hypotheses with respect to potential market effects of the regulatory proposal. Because of the highly differentiated logistical bases in the several regions, it is necessary to deal with these markets separately and, at the same time, to recognize their respective weightings in assessing overall results. The hypotheses advanced here deal with efficiency effects, rate reductions, segment impacts, and service effects.

Efficiency Effects

Potential efficiency sources are the elimination or reduction of unutilized vehicle kilometers or capacity substitution. The logistical evidence indicates that the prospects for improving vehicle utilization are dim for the West and nil for Florida and Texas. Some modest savings in vehicle operating costs might arise from the substitution of independent operator for regulated carrier capacity. More impressive opportunities appear to arise from the performance of marketing and ancillary services by a new market mechanism more effective than the existing carrier arrangement. Real resource savings may not be impressive, however, if the regulated carriers necessarily maintain these functions for other unaffected services. Cast in terms of the carriers' incremental costs, there may be no significant savings.

Rate Reductions

Potential rate reductions are a function of cost savings and competitive pressures. Assuming cost savings (consistent with the preceding efficiency discussion), the rate effects will depend on and be limited by validation

of these underlying hypotheses: (a) Current competitive pressures associated with the ICC's liberal policy in granting irregular-route truckload certificates have minimized the significance of high markup rates; (b) the independent operators and regulated carriers have a mutual interest in avoiding direct price competition and associated rate reductions; and (c) market logistics in the several regions indicate that, with orderly market behavior, competitive pressures between regulated carriers and independent operators and among independent operators for the general commodity loads will be minimal. Florida is a probable exception, but the preponderant weight of the West and Texas spells minor results overall.

There is empirical support for the first hypothesis and the other two are highly plausible given the indicated logistics patterns. The major hypothesis of minimal rate reductions resulting from the regulatory proposal is accordingly attractive.

Industry Segment Impacts

The regulated carriers face reduced lease revenues in all regions; also, Florida faces probable competitive pricing and vehicle utilization losses. Because of the market differentiation, impacts on regulated carriers depend on the distribution of their business between these three markets collectively and other unaffected markets and among these three regions. Owning carriers in the western and Texas markets should suffer minimal effects.

The independent operators would gain in the West and Texas from improved lease revenues or from alternative direct carriage. The Florida implications are less clear because of conflicting indications from improved vehicle utilization and rate reduction losses, but with a probable net gain. In addition, some excess profits may be foreseen in the West and Texas.

Service

There are no indications that warrant a hypothesis for service improvement from carrier substitution. However, the advanced market mechanism envisioned could offer improvements, particularly in terms of vehicle availability as a result of broader integration of shipper needs and vehicle supply. Any improvement could be offset by the deterioration of service for Florida's outbound general commodities as a result of the destabilization of the inbound flow of carrier capacity. Disorderly market behavior also poses a threat of service deterioration.

CONCLUSIONS

If the hypothesized market effects are realized, the regulatory proposal would offer limited benefits while posing the threat of unfavorable impacts. Although some efficiency improvement is possible, an income transfer from the regulated carriers to the independent operators is more certain. However beneficial this might be to the financially depressed independents, it is tainted by the possibility of adverse corollary conditions. This income transfer is the indicated result of market aberrations that limit competition and would thus tend to deny shippers the benefit of any reduced costs. Although price reductions appear likely in the Florida market, this advantage might well be realized at the cost of destabilizing the regulated carrier segment, essential in the northbound movement of general commodities. Prospects for the independents in Florida, on the other hand, are not significantly enhanced despite the

prospective deterioration in the condition of the regulated carriers. In effect, the income transfer would largely be from regulated carriers in Florida to independent operators in Texas and the West.

The adverse indications stem from institutional factors inherent in the proposal. Opening up the general commodity transportation market in just one direction creates harmful aberrations. In the case of joint output with the vehicle round trip as the production unit, directional differences in demand but not in market participation imposed by regulation are an integral part of the case. Also disruptive is the regulatory restraint created by the eligibility rule that ties the independents' participation in the general commodity markets to specific exempt hauls. The resulting market conditions could permit excess profits for independent operators in the western and Texas markets concomitant with a vehicle surplus in Florida. Another market aberration arises from the freedom of the independent operators to cover the entire inbound general commodity market while the regulated carriers are confined to their certificated services. This restriction opens the possibility for disorderly market behavior and unwarranted price reductions that impair service.

These considerations suggest several plausible propositions involving the applicability of the competitive model. Even though regulation may be wasteful according to model dictates, partial deregulation can be counterproductive unless carefully designed so that the residual elements of freedom and control mesh and do not clash as in this case. The competitive model does not reliably predict results when disruptive market constraints are maintained. Reliability requires that its highly restrictive postulates and conditions be met. It does not follow from the model's logic that a step toward deregulation is superior to the status quo. These propositions do not imply, however, limitations on the competitive model's predictive capabilities with respect to an unregulated trucking industry. The objectionable features of the proposal examined arise precisely because of continued restrictions on the transportation of outbound general commodities, of the regional inflexibility of independent operator vehicle employment, and of the close confinement of one set of suppliers in combination with the more universal freedom of the other.

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Motor Carrier Freight Classification and Costs of Providing Transportation Services

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The Interstate Commerce Commission is currently conducting an investigation of the motor carrier classification system. One aspect of this investigation centers on whether the factors used to categorize shipments by different rate classifications significantly impact the costs incurred by motor carriers in providing transportation services. This paper presents the results of several multiple-regression analyses on data collected by the Interstate Commerce Commission for use in motor carrier cost studies. The regression analyses provide an indication of the factors that cause differences in motor carrier costs. Conclusions are drawn about these factors and their effects on the costs incurred by motor carriers in providing transportation services.

The Interstate Commerce Commission (ICC) recently completed an investigation into the possible restructuring of motor carrier less-than-truckload (LTL) shipment rates (1). One finding of this investigation was that a number of parties to the rule-making proceeding criticized the current motor carrier classification system. Criticisms levied against the classification system included excessive complexity and the use of factors to classify shipments that have minor impact on transportation cost.

It is well known that the National Motor Freight Classification (NMFC), which is used by all general commodity motor carrier rate bureaus except those providing primary service in New England, is essentially a copy of the railroad's Uniform Freight Classification. The shipment characteristics used by the NMFC to determine the class ratings for individual commodities are shipment density, liability to damage, liability to damage other commodities with which it is transported, perishability, liability to spontaneous combustion or explosion, susceptibility to theft, value per kilogram compared to other articles, ease or difficulty in loading or unloading, stowability, excessive weight, excessive length, care or attention necessary in loading and transporting, trade conditions, value of service, and competition with other commodities transported. In contrast to these characteristics the Coordinated Classification used by New England-area motor car-

riers uses only the characteristics of shipment weight and density to determine a shipment's class rating. Schuster (2) and Winship (3) have also shown that the NMFC permits extensive internal cross-subsidies to occur between shipments of different weights, class ratings, and those that are moved in different traffic lanes.

The purpose of this paper is to determine whether the factors used to place shipments in different rate classifications are related to the costs incurred by the general freight motor carrier in providing transportation services. First, an overview of the ICC's motor carrier cost model is presented. Second, research findings that indicate factors causing differences in motor carrier costs are presented. Finally, conclusions are drawn as to whether factors used in the classification process affect the costs incurred by motor carriers in providing transportation services.

ICC MOTOR CARRIER COST MODEL

The ICC model of the general freight motor carrier firm (4) postulates four major sets of activities required to accomplish intercity freight movements: (a) line haul (intercity movement), (b) pickup and delivery, (c) terminal platform handling, and (d) billing and collection. The activities—with the exception of billing and collection—undertaken by motor carriers to effect commodity movements include loading on truck at shipper's dock, unloading at terminal to cart, loading highway trailer from cart, unloading highway trailer at destination terminal, loading city delivery truck, unloading delivery truck at consignee's dock, unloading at break bulk terminal, and loading on another trailer for destination terminal. Break bulk terminal adds two more stage handlings, and interlining adds at least four more handlings.

The ICC cost methodology uses two formulas, Highway Forms A (5) and B (6), to estimate the costs of motor carrier freight movements. The formulas postulate that motor carrier costs are primarily a func-